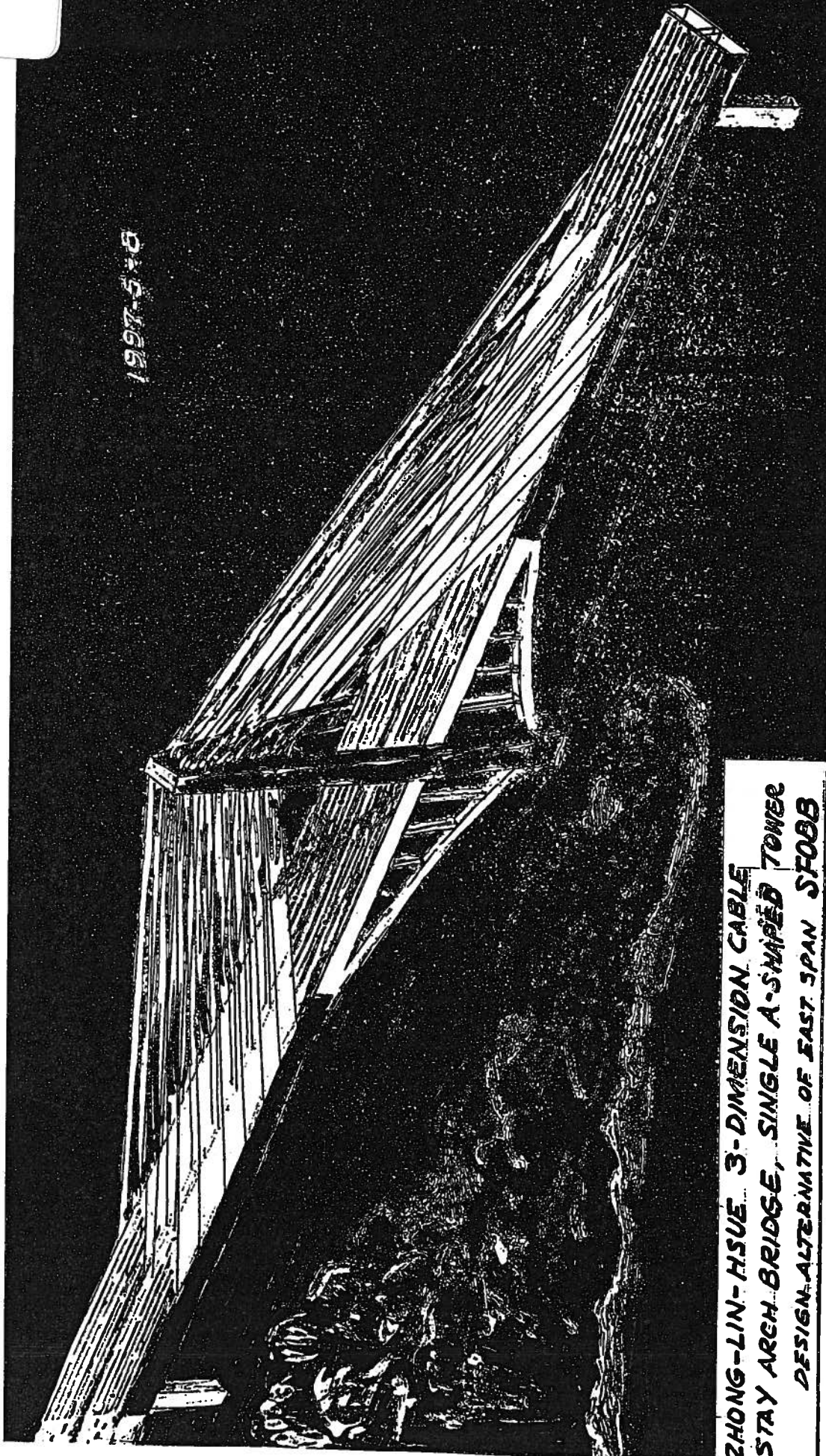


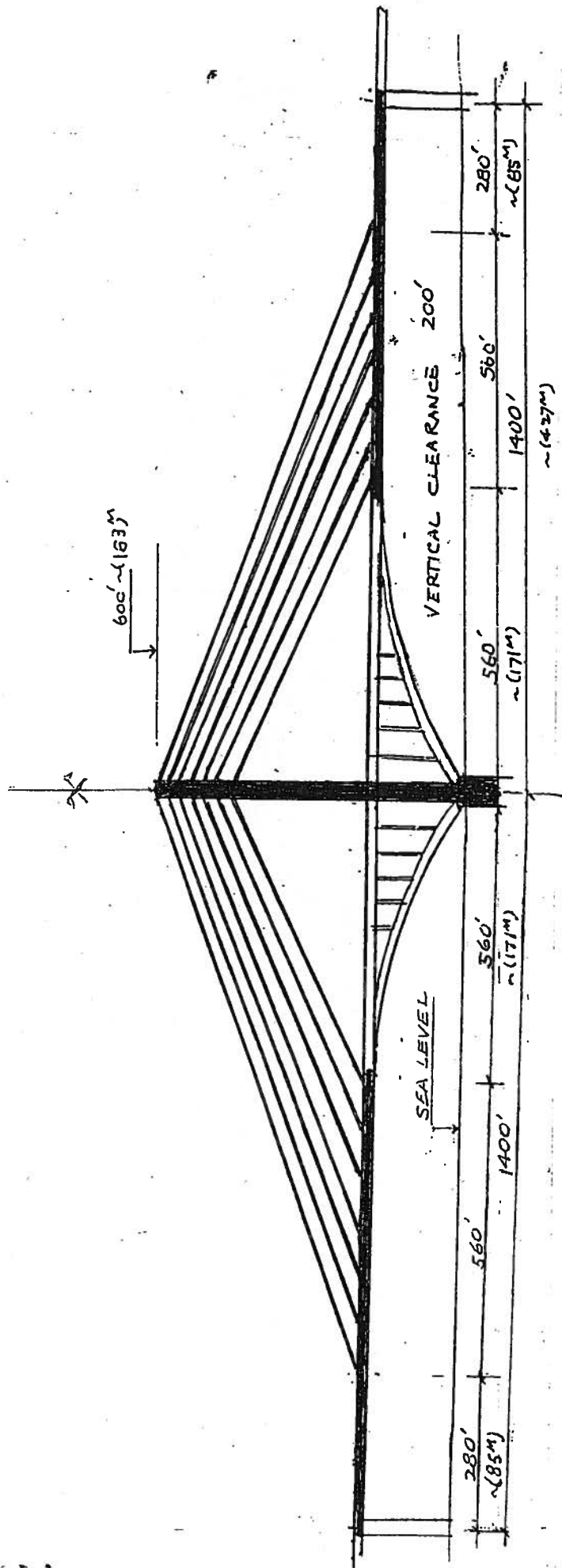
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1997-5-8



ZHONG-LIN-HSUE 3-DIMENSION CABLE
STAY ARCH BRIDGE, SINGLE A-SHAPED TOWER
DESIGN ALTERNATIVE OF EAST SPAN SFOOB



DESIGN ALTERNATIVE OF EAST SPAN SFQBB

ZHONG-LIN-HSUE 3-DIMENSION CABLE STAY ARCH BRIDGE

SINGLE A-SHAPED TOWER

1997-5-8

FEATURES OF OUR DESIGN ALTERNATIVE

Based upon two special cautions for structural analysis of cable stay bridge and other kinds of bridge with large span in high seismic region. I had raised up in last two public meetings held by CALTRAN&MTC. In view of such cautions, We'll present our design alternative for new bridge for east span SFOBB. This design alternative or conceptional design option designed by Prof. HSUE, CHENTUNG, American consultant, bridge mechanic Group, Reviewed by expert of bridge engineering, bridge mechanics group, SKLESA PRC, member of Academy of Science PRC. also reviewed by Full Prof. LIN, JIAHAO established the PEM of linear random vibration structural analysis, bridge mechanics group, SKLESA, PRC.

1. Single A-sharped tower, steel 3-dimension cable stay bridge and R.C arch bridge composited structural system symmetrically spanned (1400') the waterway to Oakland harbour, (ABBV: 3-D cable stay arch bridge). 3-D cable stayed on the bridge deck structure would help under high seismic excitations as well as gust (heavy wind)
2. Single tower would be sunk into the bedrock of Yeuba Buena island.
3. Composited structural system with 2 kinds of bridge, each has his own point.

Cable stay bridge spanned 840' uses composite structure of bridge deck. They are made of a steel grid of 2 main girders along the deck adges with steel cross griders spanning 60' at 15' distance and a R.C. slab on top formed by 10" thick R.C. precast panel and cast in situ joints.

4. Shorter cable stay bridge would help to reduce the unfavorable prestress occurred usually on the mid span of cable stay bridge in some extent due to shorter span of cable stay bridge of composite structural system as mentioned above.

5. R.C. arch bridge uses the precast R.C. segments taking advantage of temporary cables stayed on the tower to set up in situ joints. This construction conception does not only lead to a quick and simple erection procedure but also offers the economical advantage that the concrete segment acts as a compression member to take most of the horizontal thrust from cable stay deck—besides carrying dead weight of arch bridge and the vehicle load of arch bridge deck.

6. Less cables stayed on the cable stay arch bridge not only easily carries out their construction but also creates an elating liberation of space under less cables and expecially λ -shaped less cable stay bridge matches

with curved arch bridge forms an arsthetic appearance.

7. This design alternative accomodates adsequate ample room on either for bicycle lane and handicaped facility lane and shouder lane for installed vehicles.

8. This design alternative offers a lot of vent holes along the central lane of the deck would help keep very wide deck from buffeting or flutter effect due to gust excitation.

BRIEF STATEMENT OF PROF. LIN'S PSEUDO EXCITATION
METHOD (PEM) OF LINEAR RANDOM VIBRATION STRUCTURAL ANALYSIS

Prof. Lin's PEM in random vibration analysis has been set up on the advanced and top level on the world records. The distinguished features of his PEM comprises (a). In form, the PEM transforms random excitations into deterministic ones, and so simplifies the computation process considerably, the more important thing is that the PEM implements the CQC algorithm of random vibration not only to be quite efficiently. Typically, it is 100 or more times faster than the conventional methods available in the literature, but also to make analysis of wave passage effect (however the well known spectrum response method practically introduce CQC algorithm of random vibration for comparatively not so complex structure cannot be used for analysis of wave passage effect) (b). the ease of mastering the theoretical study by engineers and researchers and (c). the relevant computer program with very high efficiency (to get a precise result in a very short time) not only in the seismic (wind excited vibration...) stationary analysis of complex structures with several thousand degrees of freedom with ground surface nodes around 100, but also in non-stationary random vibration analysis. Just to do a seismic analysis for such complex structures with a great number of degrees of freedom and ground surface nodes is cannot be done by any other updated editions of software such as SAP, NASTRAN, ANSYS... being available in the United States.

The capability of the EPM program requires a computer with 1000 MB hard disk and 16MB RAM.

MEMORANDUM

TO: ALL PERSONS ATTENDING A MEETING 97/5/12~97/5/14 HELD BY THE
ENG'G AND DESIGN ADVISORY PANEL, MTC
FM: HSUE, CHENTUNG, AMERICAN CONSULTANT

II WE ARE VERY INTERESTING THE DESIGN OPTIONS: SKYWAY, TWO-TOWER CABLE STAY AND ONE TOWER CABLE STAY OFFERED BY CALTRAN AND MTC AS WELL AS ANY OTHER DESIGN ALTERNATIVES, RECOMMENDATIONS & EVALUATIONS PRESENTED IN THE MEETING ON THE WATERFRONT PLAZA HOTEL, REGATTA ROOM, JACK LONDON SQUARE, OAKLAND BY THE ENGINEERING & DESIGN ADVISORY PANEL, MTC. WE ARE SUPPORTING ORALLY & BY ACTION ALL OF THEM AS MENTIONED ABOVE. WE'D LIKE SHARE THE BREAK-THROUGH ACHIEVEMENT OF PROF. LIN JIAHAO'S PSUEDO EXCITATION METHOD (PEM) RANDOM VIBRATION RESPOME FOR SEISMIC STRUCTURAL ANALYSIS TO WHATEVER DESIGNS OF NEW REPLACEMENT BRIDGE OF EAST SPAN SFOBB. IF NEEDED, PLEASE CONTACT AMERIRCAN CONSULTANT: HSUE, CHENTUNG OR MAKE AN APPOINTMENT WITH WHATEVER GROUP, AGENCY, CONSULTANT ASSOCIATE AND DESIGN FIRM ABOUT COOPERATION OR JOINT WORKING WITH PROF. LIN JIAHAO AND HIS PEM RANDOM VIBRATION RESPONSE COMPUTER PROGRAM FOR SEISMIC STRUCTURAL OF DESIGN OF NEW BRIDGE OF EAST SPAN SFOBB.

I WELCOME TO GIVE ORAL AND WRITTEN COMMENTS OR ADVICES TO ZHOUG-LIN-HSUE'S DESIGN ALTERNATIVE: 3 DIMENSIONAL CABLE STAY STEEL DECK & R.C. ARCH BRIDGE (COMPOSITE STRUCTERAL SYSTEM).

AMERICAN CONSULTANT (BRIDGE MECHNICS ROUP, STSTE
KEY LAB. OF ENGINEERING STRUCTURAL ANALYSIS, PRC)
275 28th STREET, STE 432, OAKLAND, CA 94611-6064
FAX: (510)451-2707
DATE: MAY 14, 1997

(97/5/16 ~ 97/6/10 DURING PERIOD OUT OF STATE)
(FAX: (510)796-9550, FAX:(516)681-9875)